SERIES 9 SWITCHLITE

MODULAR DESIGN

SINGLE SCREW MOUNTING

TWO STEP RELAMPING

FOUR LAMP DESIGN

HORIZONTAL SPLIT

SPRING LOADED LAMP SOCKETS

DUAL INPUT BUSSING

MOMENTARY ACTION SWITCHING

FULL OR SPLIT LENSES

VERT SPLIT

UNIJUNCTION TERMINALS

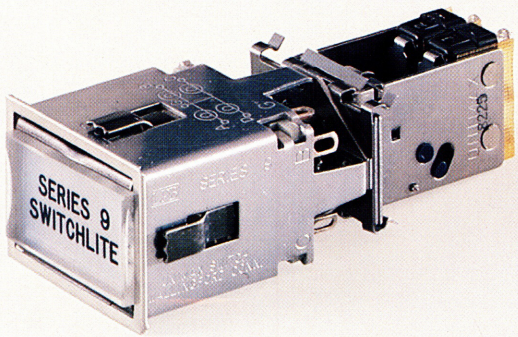
SNAP ON HOLDING COILS

ALTERNATE ACTION SWITCHING

FLUSH MOUNTED

Unimax LPB® Series 9

Illuminated Push Button Controls



Unimax Switch CORPORATION

CATALOG 50-8 ISSUED OCTOBER 1982

Unimax Series 9, 9M and 9H MIL-Type Lighted Pushbutton Controls get fast, flexible action and reaction through

- *4-lamp Illuminated Displays*
- *Multi-Switch Configurations*
- *Color-Coded Messages*
- *Electrical Interlocks*
- *Field-Interchangeable Components*

INDEX

	General Information Page	Technical Information Page
Introduction	2	
Construction	3	
Relamping	3	3
Mounting(s)	3 &4	3
Actuation	4	
Terminals	4	7
Legends	5	11
Front Lenses	5	10
Diffusers	5	9
Filters, Color	5	10
Lamps & Lamp Voltages	5	10
Exclusive Features:		
Sockets, Lamp	6	6
Internally Bussed Lamp Circuits	6	6
Circuits, Diagrams		9
Switches	7	10
Terminals, Switch	7	7
Coils, Holding	7	9
Optional Items	8	8
Ordering Procedure	8	8 thru 11
Basic Dimensions:		
Indicator & Switch Unit		12
Holding Coil Unit		12
Switches		12
Panel Cutout		12

The LPB Series 9, 9M, and 9H are four-lamp pushbutton panel controls designed to conform with the requirements of Military Specifications:

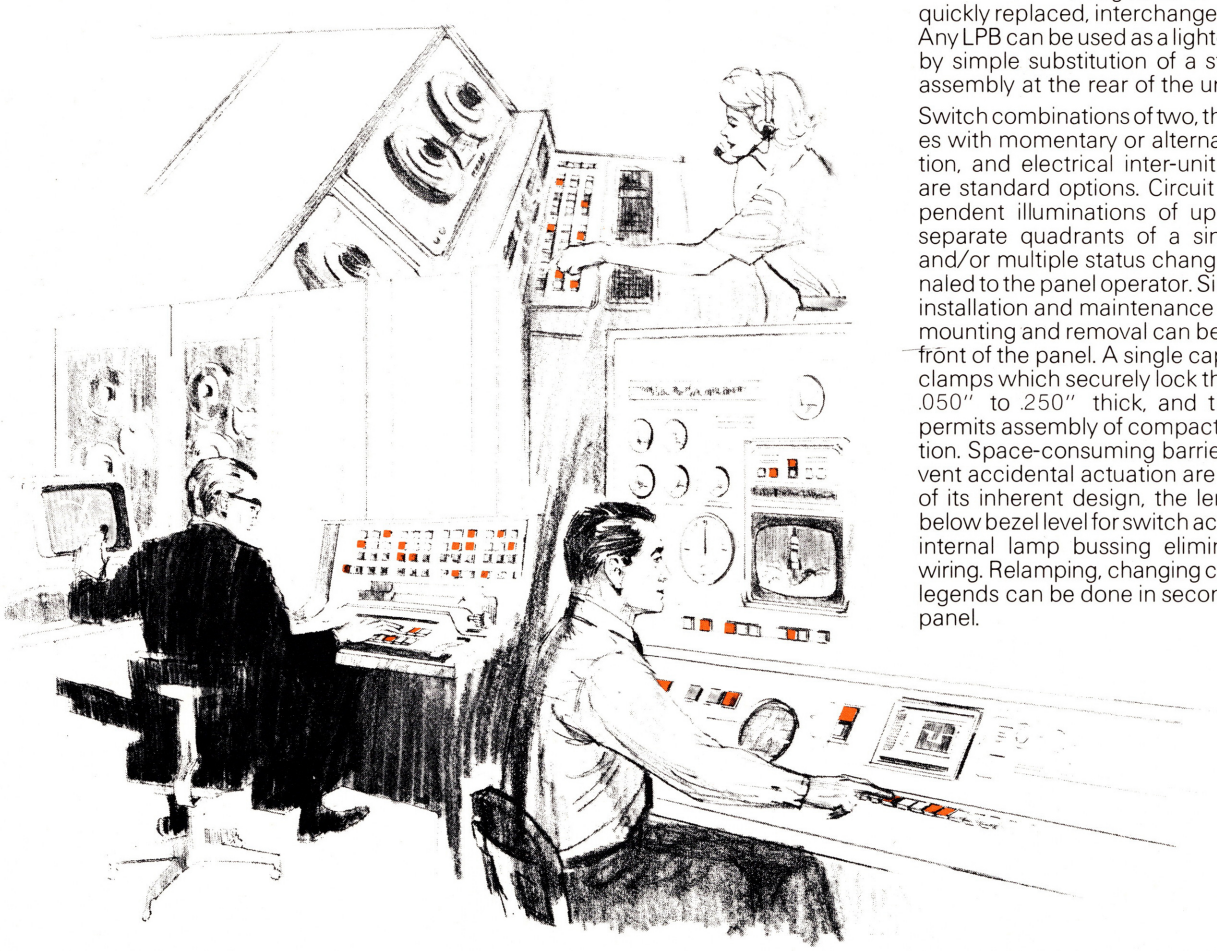
Series 9: Standard 4-lamp LPB Switch

Series 9M: Mil-approved versions of Series 9. Approved to MIL-S-22885-/9 thru / 12

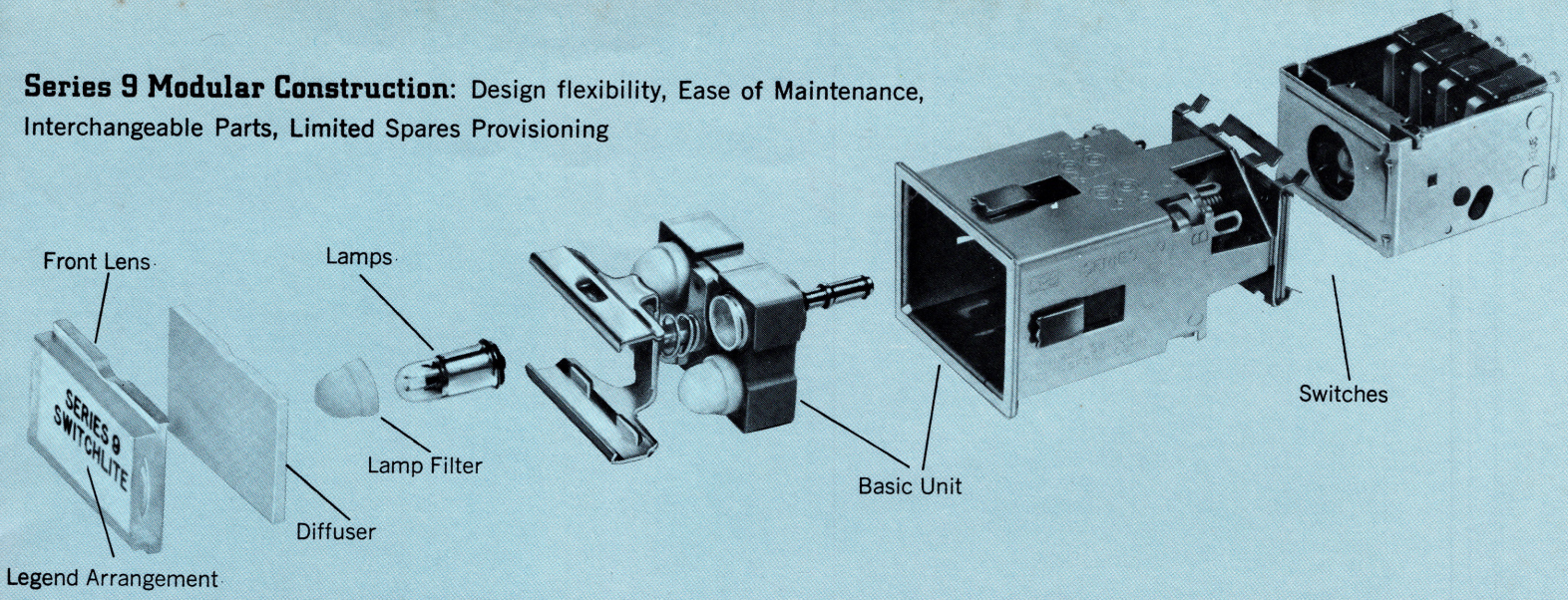
Series 9H: Designed to conform to MIL-S-22885 and meets requirements of MIL-S-901C (High Impact). Orginally developed for Navy shipboard installations to meet their high shock requirements.

They offer an extremely broad choice of combinations of display arrangements, color coding, switching, and customized messages, all of which can be easily and quickly replaced, interchanged or modified in the field. Any LPB can be used as a lighted pushbutton switch, or by simple substitution of a stop plate for the switch assembly at the rear of the unit, as an indicator light.

Switch combinations of two, three or four SPDT-switches with momentary or alternate push-on push-off action, and electrical inter-unit interlocking provisions, are standard options. Circuit versatility permits independent illuminations of up to four lamps, in four separate quadrants of a single pushbutton. Single and/or multiple status changes are thus instantly signaled to the panel operator. Simplicity and economy of installation and maintenance are assured, because all mounting and removal can be accomplished from the front of the panel. A single captive screw controls four clamps which securely lock the unit to any panel, from .050" to .250" thick, and the narrow-profile bezel permits assembly of compact arrays in any configuration. Space-consuming barriers between units to prevent accidental actuation are not necessary. Because of its inherent design, the lens has to be depressed below bezel level for switch actuation. Factory installed internal lamp bussing eliminates costly installation wiring. Relamping, changing color codes or substituting legends can be done in seconds, from the front of the panel.

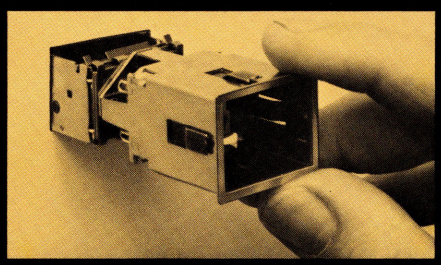


Series 9 Modular Construction: Design flexibility, Ease of Maintenance, Interchangeable Parts, Limited Spares Provisioning

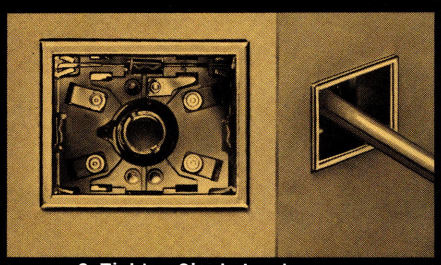


Mounting: Simple–Unique

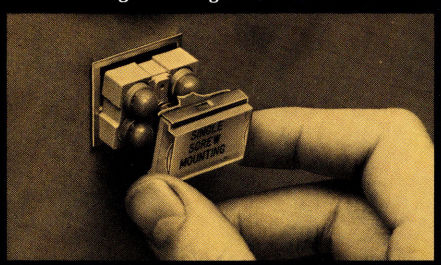
Mounting or removal of the Series 9 is accomplished from the front of the panel by tightening or loosening a single captive screw. This single screw controls four clamps which securely lock the unit to any panel between .050″ and .250″ thickness. No mounting sleeve or loose hardware is required.



1. Place Unit in Panel



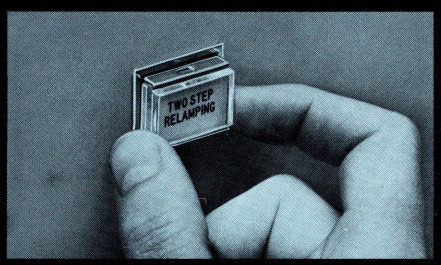
2. Tighten Single Leadscrew



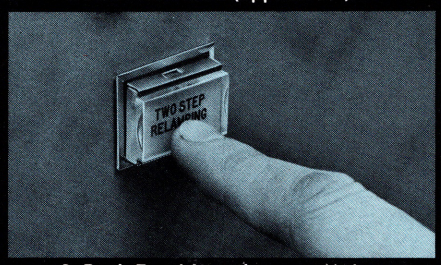
3. Insert Front Assembly

Relamping: Two Step–No Tools

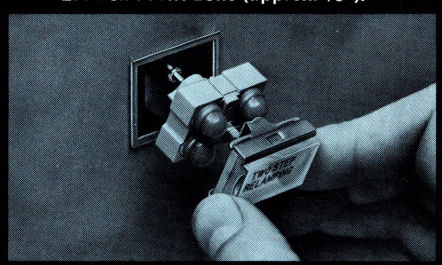
A simple Pull-Push action frees the lamp holder assembly when lamps or filters require changing. Filters and lamps are independently mounted and either can be easily replaced without disturbing the other. (Series 9H requires an additional step to release the anti-shock-locking mechanism—see page 4).



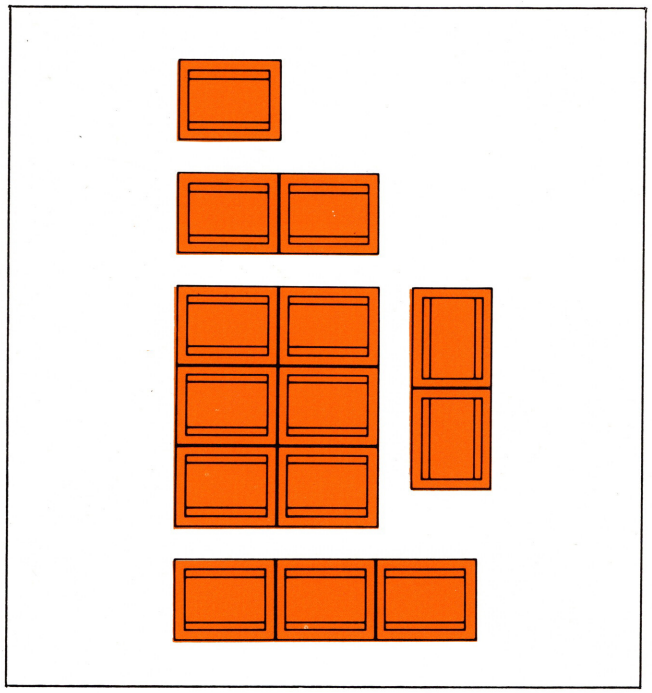
1. Pull Front Lens (approx. ¼″).



2. Push Front Lens (approx. ⅛″).

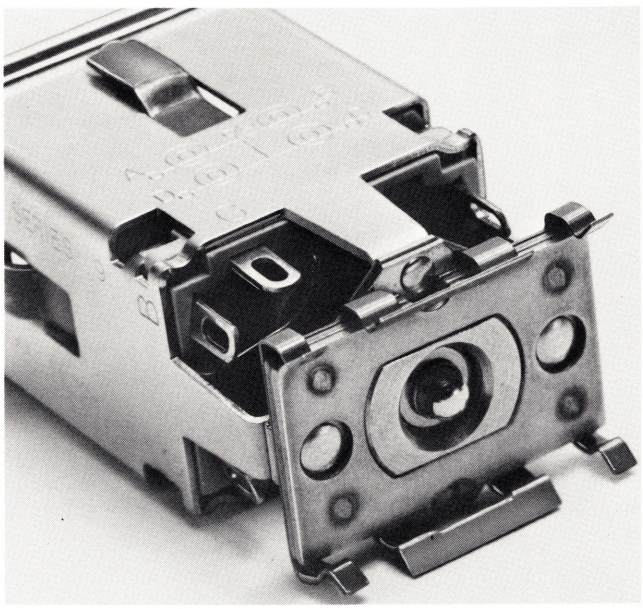


3. Remove From Unit.



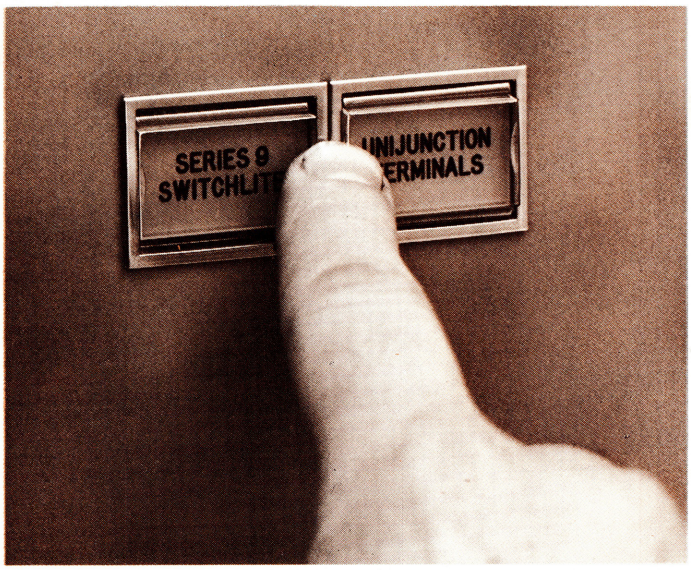
Single, Line, or Matrix Mountings

Unimax LPB Series 9, 9M, and 9H can be mounted singly, in vertical or horizontal rows, and/or in space saving panel matrices. In every case the lights are individually mounted and not dependent upon other units for support. This feature permits centrally located units to be replaced without disturbing adjacent controls.



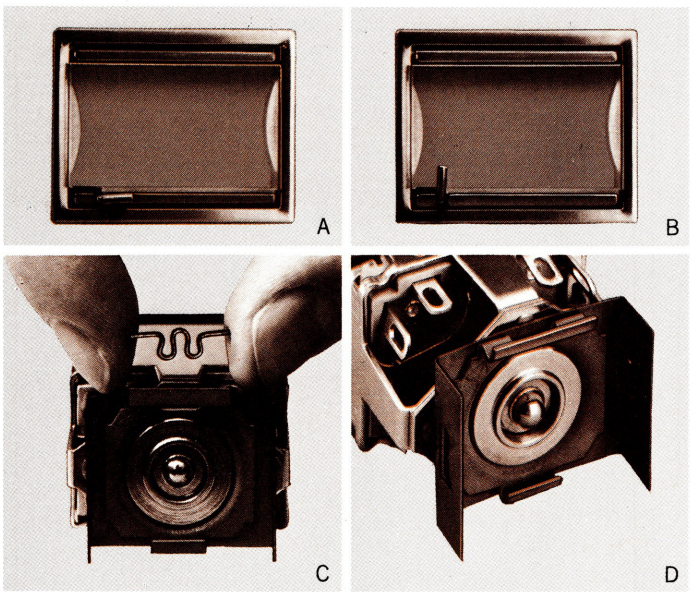
Ease of Wiring

As seen in the photo, lamp and ground terminals are easily accessible. This makes wiring and soldering a quick, simple operation.



A Safeguard against Accidental Actuation

Series 9, 9M, and 9H LPB's are designed to effect switch transfer only after the lens has been depressed below the housing bezel. The bezel, plus the actual separation of lenses, prevents an operator from actuating more than one switch at a time (see illustration). The bezel is actually a built-in safety feature, offering the additional design factor of eliminating the need for space-consuming barriers between units.



9H High-Impact Shock Protection

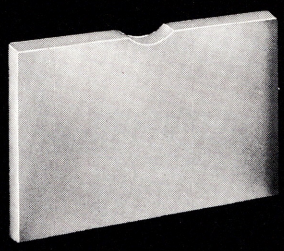
Series 9H LPB's are designed to withstand the drastic shock conditions as required of MIL-S-901C (High Impact). The high shock resistance is achieved by the following design modifications. Fig. A shows a locking tab which is secured to the lens retainer to prevent lens removal under shock conditions. Fig. B shows it in the lens removal (unlocked) position. Fig. C shows the "w" clip which is inserted into the Webb clip, the function of which is to hold the switch module. Fig D —when a holding coil is also specified, an additional holding clip is incorporated. This clip holds the coil on all four sides for added shock protection.

Display Section: Legend and Color

Note: Unimax LPB Series 9, 9M and 9H display components are easily replaced, changed or modified without special tools or skills.

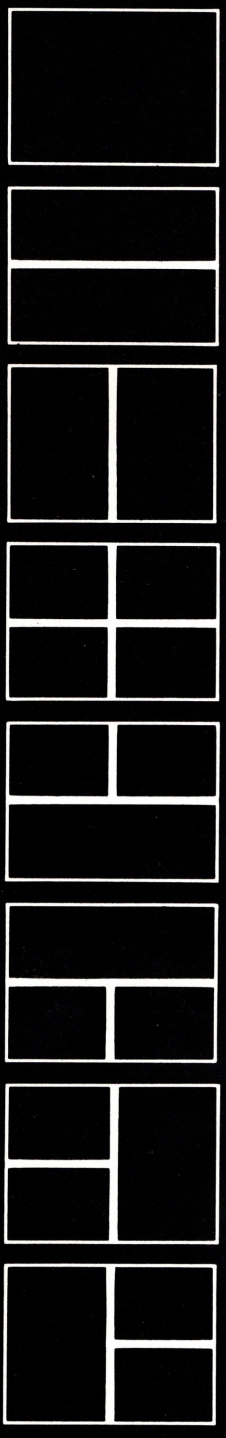
Front Lenses for your Message

The front lens is normally furnished clear and is optionally factory-engraved on the reverse side. Lens can be furnished in "Solar" material for hidden legend.



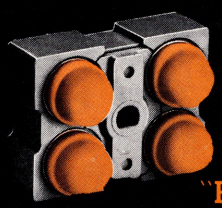
Display Screens (Diffusers)

Display screens fit behind the front lens and diffuse the light for clear and uniform illumination. They are normally furnished translucent white, but are available in color when specified. Each section of a divided diffuser is shielded by internal barriers to prevent cross-illumination between sections.



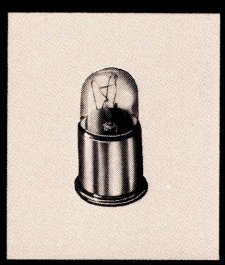
Colored Screens – "Transmitted Color"

Certain LPB applications require a color indication prior to as well as during lamp illumination. It is usually recommended in these cases that colored translucent screens be used. The illuminated color will be the same as the non-illuminated screen; however, a definite change in intensity occurs when the lamps are energized, giving a clear indication of modes.



Lamp Filters– "Projected Color"

Unimax LPB Series 9, 9M, and 9H incorporates individual silicone rubber filters. This technique permits viewing of the legend against a white background until an input signal is received. Projected colors guard against "operator pre-conditioning" to functional changes of the display. Lamp filters are manufactured to rigid quality control procedures, thus guaranteeing balanced display illumination. A choice of six standard colors is available.



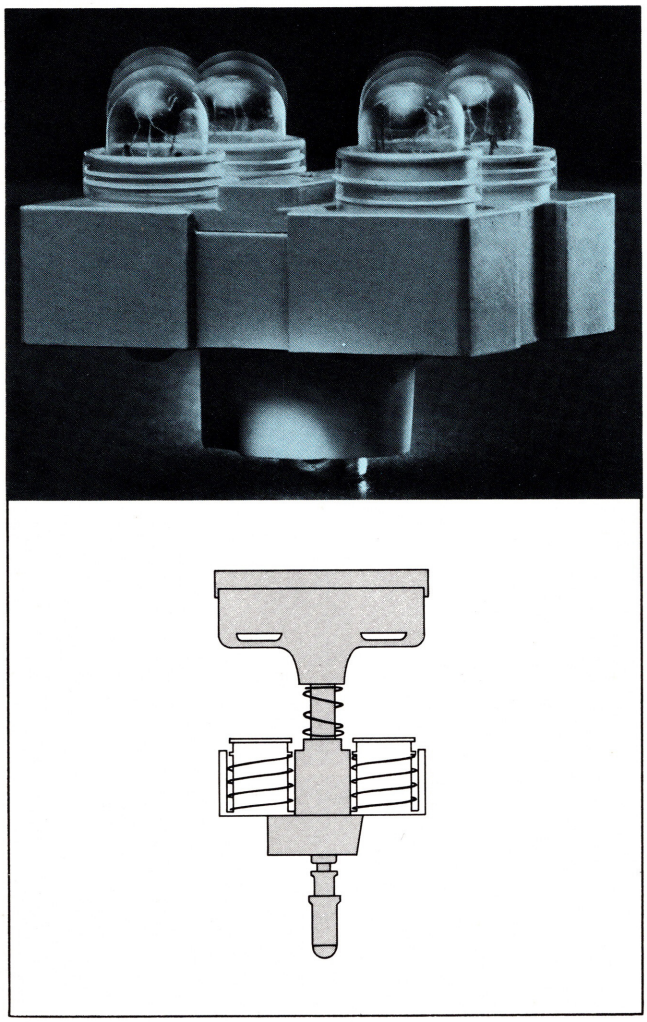
Lamps and Lamp Voltages

Each LPB will accept four T 1¾" miniature flanged base lamps (MS25237). Lamps are available in 6, 12 and 28 volts D.C.

FEATURES EXCLUSIVE WITH UNIMAX LPB SERIES 9

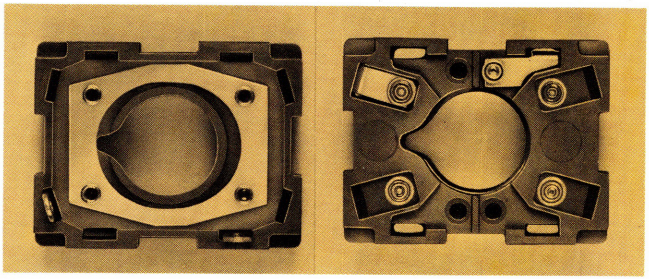
Lamp Sockets Eliminate Continuity Problems

These Unimax LPB controls have replaced the traditional spring loaded lamp contact with a unique spring loaded lamp-socket. This design eliminates the usual terminal-to-lamp continuity problems. The lamp socket adjusts for lamp contact tolerances, and remains stationary during switch actuation.



Internally Bussed Lamp Circuits Eliminate Jumpers and Soldering.

A significant advance in the circuitry of illuminated controls is now offered for the first time in these Unimax LPB Controls. It is the availability of internally bussed lamp circuits, specified as part of the Basic Unit and installed at the factory.



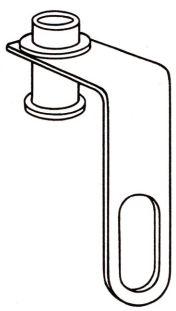
This feature eliminates the need for costly in-house installation of jumpers and soldering, and reduces dramatically the number of possible failure points. A comparison of a Unimax LPB equipped with a factory-installed buss as opposed to the conventional circuitry of an illuminated control highlights the significance of this new feature:

	Conventional Circuit	Series 9, 9M, and 9H Circuit #26
Solder connections required	**5**	**2**
Jumper wires required	**3**	**0**

From the above comparison it is obvious there is an overall increase in product reliability, and an overall decrease in unit cost thru the use of internal bussing. Direct savings of up to 60% in installation wiring costs is one of the benefits of internal lamp bussing.

Lamp Contact/Solder Terminal, Metal-to-Metal

With Series 9, 9M and 9H controls, a "unijunction" (metal to metal) solder terminal-to-lamp contact is assured. Lamp contact cannot be affected by an excess of solder flux or cleansing agent.

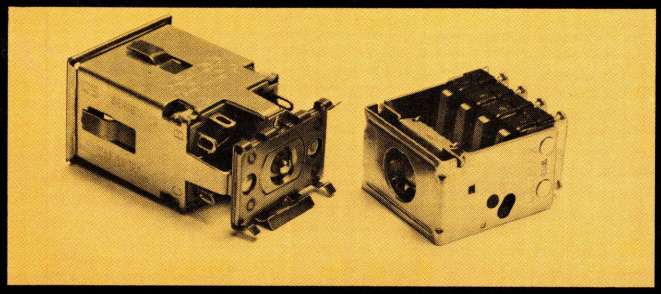


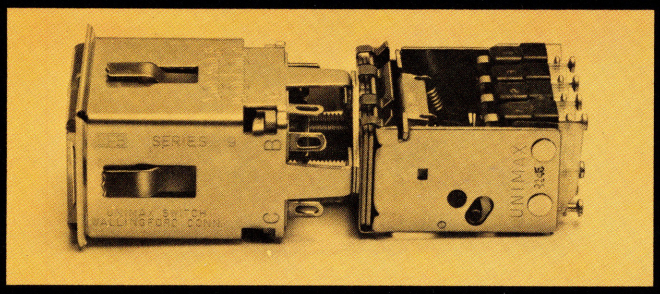
Snap-On Switch Modules

Consistent with the modular design of these controls, the switch modules are installed or removed by a single snap-off, snap-on connection. The modules consist of one, two, three, or four sub-miniature snap action switches, mounted in stainless steel brackets, with a snap-drive mechanism for momentary or for push-on/push-off alternate action. The alternate action drive is based on an over-the-center mechanism with a prestressed coiled spring toggle assuring positive transfer. The speed and/or force of actuation does not affect the operating position or transfer time.

Unimax Switch Modules conform with the requirements of all applicable Military Specifications. Series 9M switch modules are approved to MIL-S-22885/11. Switches are available with silver (standard), or gold crossbar* contacts. Ratings are:

10 amps @ 125 or 250 VAC
3 amps inductive @ 30 VDC
5 amps resistive @ 30 VDC
*1 amp @ 125 VAC 1 amp @ 30 VDC (max. rating)





Terminals:

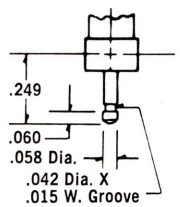
Standard modules are furnished with double-turret terminals which will accept TWO #20 (AWG) wire leads. (Style D)

The following terminal styles are also available upon special request:

1. Male solderless terminal which will accept miniature, female, quick-connect terminals. (Style A)
2. Single-turret terminal. (Style C)
3. Solder terminal with an .058″ dia. hole. (Style E)

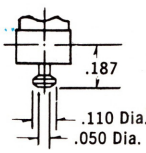
STYLE A
QUICK CONNECT

Male solderless terminal that fits miniature, female quick connect terminals



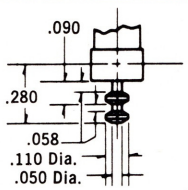
STYLE C
SINGLE TURRET

Facilitates solder and wrap around connections



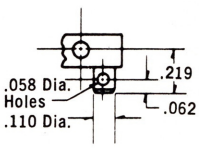
(STANDARD)
STYLE D
DOUBLE TURRET

Facilitates Solder, Wrap-around and Junction Joint Connections



STYLE E
SOLDER

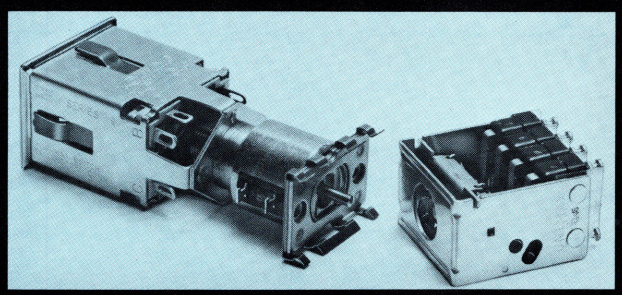
Wire is inserted in terminal hole for strong mechanical connection

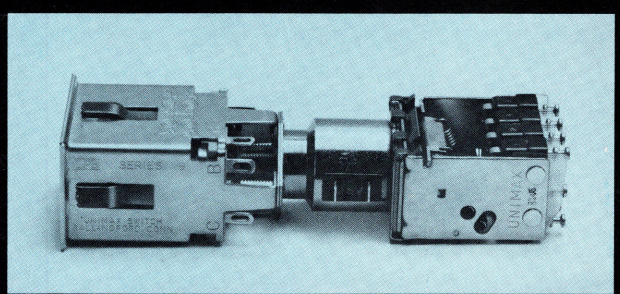


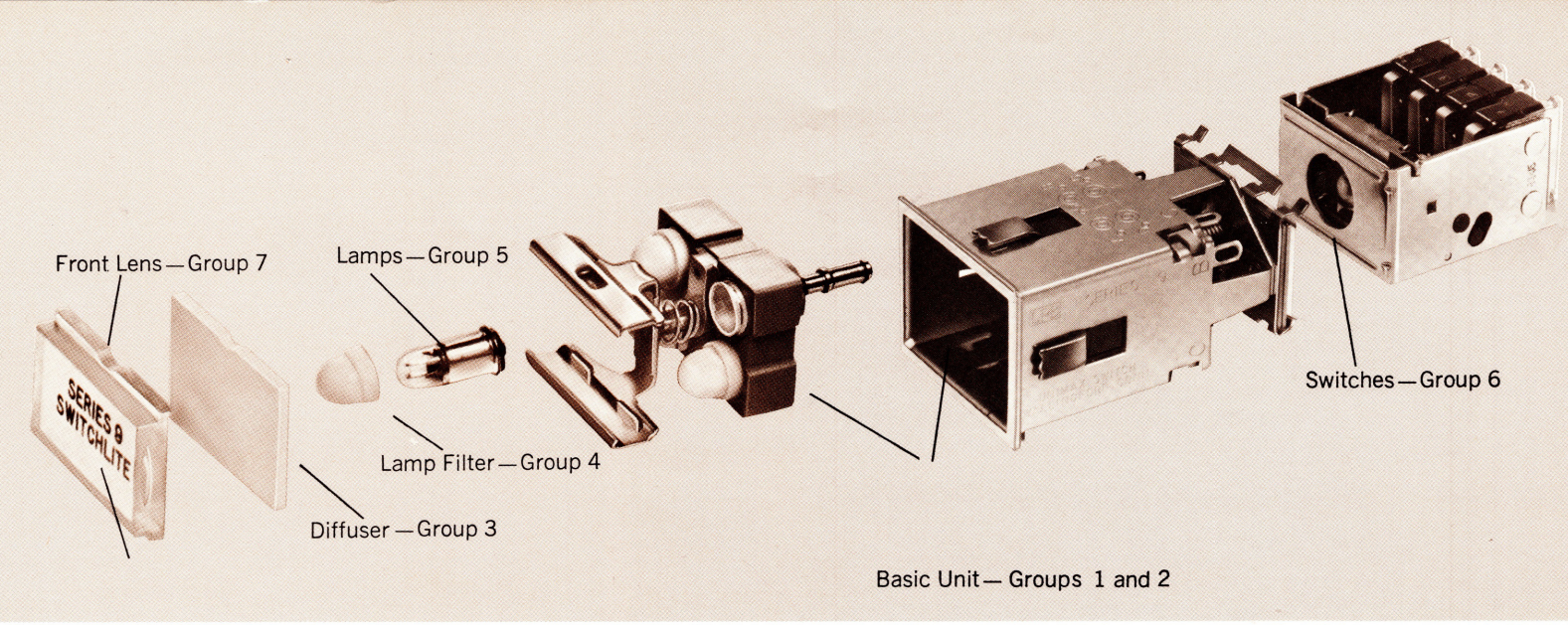
TOLERANCES — unless otherwise stated: 2-place decimals ±.015″, 3-place, ±.005″.

Snap-On Holding Coils

Unimax LPB Series 9, 9M, and 9H are easily converted to electrical lock-in units by the addition of a snap-on magnetic coil placed between the housing and switch module. The use of this coil enables individual or groups of LPB's to be electrically interlocked. Coil voltage ratings of 6, 12 and 28 VDC are standard; power required is 3W @ 28 VDC. Circuit diagrams which show typical schematics are available from your Unimax representative.







HOW TO ORDER UNIMAX LPB SERIES 9, 9M, OR 9H CONTROLS, INDICATORS, AND COMPONENTS

For Complete Assemblies

Code numbers are assigned to each individual variation within a sub-assembly or component group. The final ordering code for a completely assembled unit consists of a composite of the code numbers for each of the sub-assemblies or features you have selected. The final code number must be grouped so the first numbers of all code numbers are in numerical sequence. Always identify the assembly by preceding it with the prefix "9 —," "9M —," or "9H —."

Note: When a sub-assembly or feature is to be omitted, there is a code number assigned to the omission as well. These code numbers MUST be used when an omission is desired.

For Separate Sub-Assemblies or Components

Individual sub-assemblies or components may be ordered by using the prefix "9 —," "9M —," or "9H —" and selecting the code number appropriate to the sub-assembly selected.

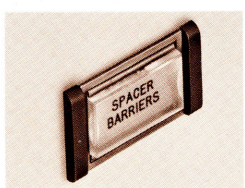
SERIES 9, 9M, 9H — **11 21 31 412 51 61 71 81**

- 11 — Basic Unit—Group 1 (See page 9)
- 21 — Lamp Circuit—Group 2 (See page 9)
- 31 — Diffuser Style—Group 3 (See page 9)
- 412 — Colored Lamp Filters—Group 4 (See page 10)
- 51 — Lamps—Group 5 (See page 10)
- 61 — Switches—Group 6 (See page 10)
- 71 — Front Lens—Group 7 (See page 10)
- 81 — Legend Arrangement—Group 8 (See page 11)

OPTIONAL FEATURES

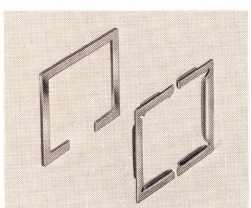
Switch Guards

A hinged clear plastic cover must be manually raised in order to actuate the LPB, preventing accidental switch operation.



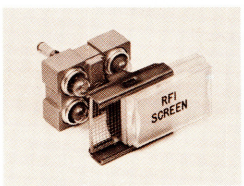
Spacer Barriers

Spacer barriers provide additional separation between adjacent units. Available in several colors.



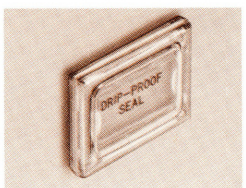
Rear Mounting Kit

Allows prewiring and assembly to panel from rear.



RFI Shielding

A fine wire screen provides protection against undesirable RFI energy passing through the LPB.



Drip-Proof Seal

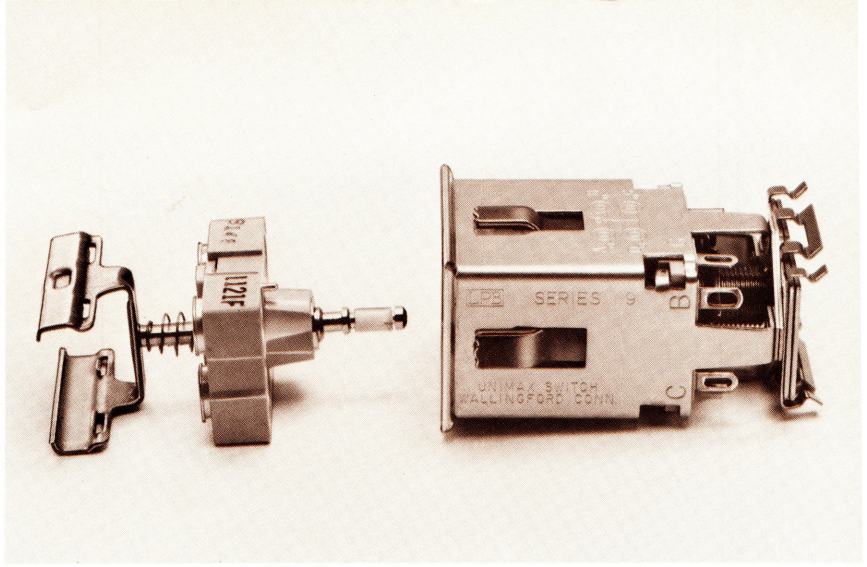
A clear seal prevents the entrance of liquids and foreign matter through the LPB. Easily removable for relamping.

Contact Factory For Further Information

Group 1–
Basic Unit & Actuator Assembly (1 each required)

Description	Code No.
Switch Actuator Assembly	11
Switch Actuator Assembly (with 28 V.D.C. holding coil)	13
Switch Actuator Assembly (with 12 V.D.C. holding coil)	14
Switch Actuator Assembly (with 6 V.D.C. holding coil)	15
Indicator Assembly	16

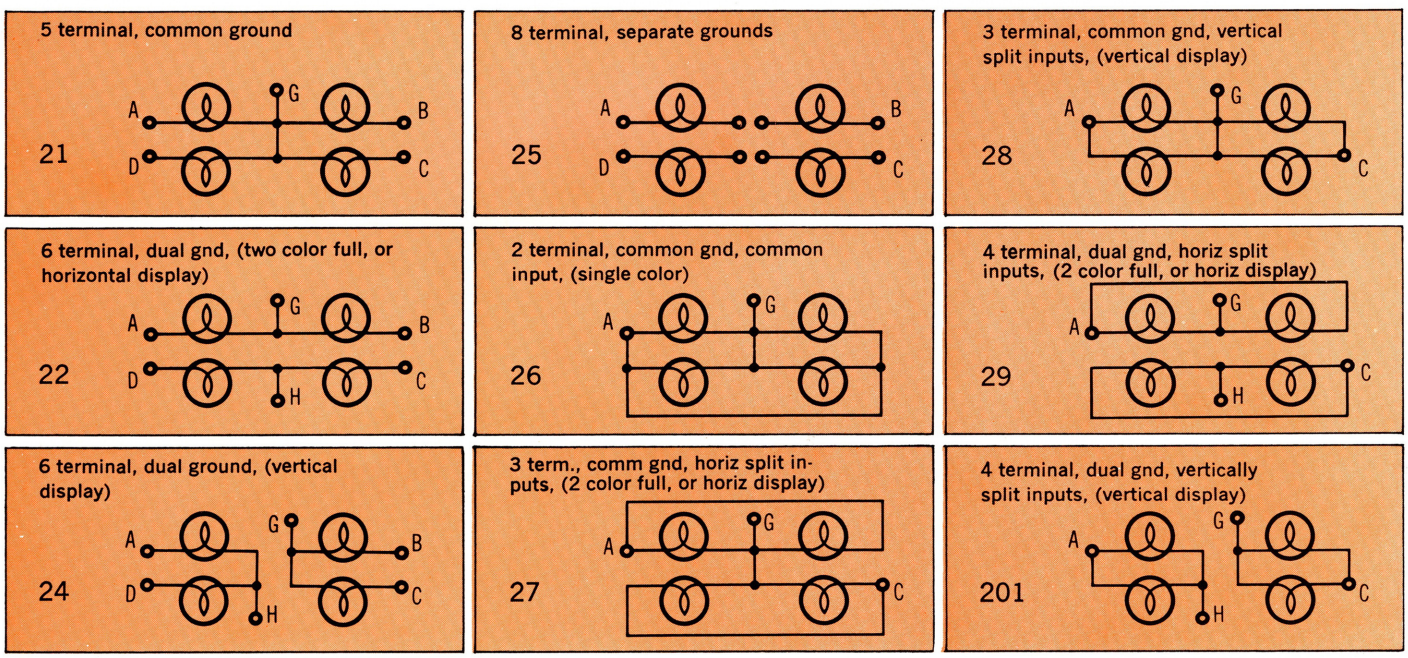
Part Number Build-Up Example: Series 9-11



Group 2–
Lamp Circuits (1 each required)

The lamp circuit is an integral part of the basic assembly and must be selected for each unit. Add the code number for the circuit selected to the Basic Unit Code number.

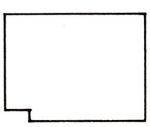
Part Number Build-Up Example: Series 9-1121



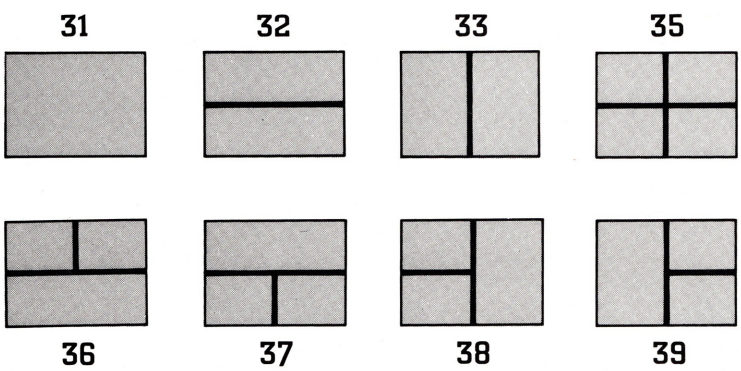
Group 3–Diffusers (1 each required)

The diffuser determines the display style of the switch (full, horizontal, vertical, etc., as shown).

Part Number Build-Up Example: Series 9-1121



Diffusers for Series 9H (High Impact) are notched as shown on left to provide clearance for shock-protection lock tab.



Note: When Assembled Unit is required without a Diffuser use the code no. "30."

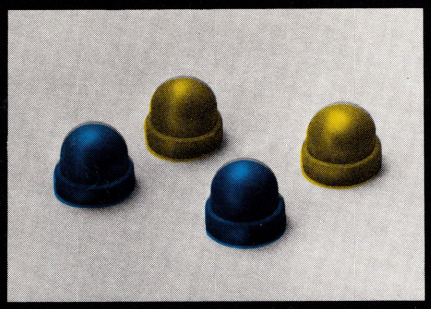
Group 4—Lamp Filters

(4 Each Required)

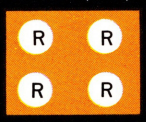
The upper left lamp position (as viewed from the panel face), has been established as the starting point for the designation of color presentation. The sequence should always be clockwise from the upper left. The code number will be 4 followed by one to four numbers, depending upon the color requirements.

Code No.	Description
40	Unit furnished less colored lamp filters
41	Red
42	Green
43	Amber
44	Yellow
46	White, (filter is pale blue in appearance)
47	Blue

Part Number Build-Up Example: Series 9-112131412

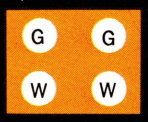


Full Display
One Color (Red)



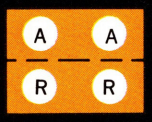
41

Full Display Two
Color (Green & White)



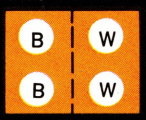
426

Horizontal Split
Amber & Red



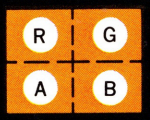
431

Vertical Split
Blue & White



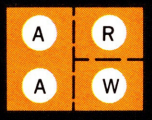
476

Four-Way Split
Red-Green-Blue-Amber



41273

Three-Way Split
Amber-Red-White



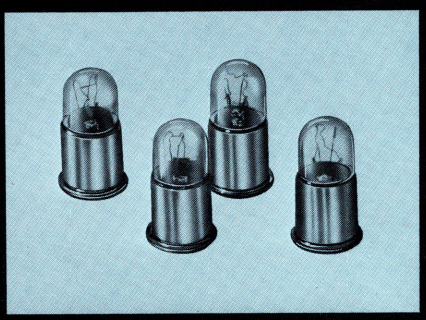
4316

Group 5—Lamps

(4 Each Required)

Code No.	Description
50	Units furnished less lamps
51	MS 25237-328, 6 volts
52	381, 6 volts (long life)
53	330, 14 volts
54	382, 12 volts (long life)
55	MS 25237-327, 28 volts
57	387, 28 volts (long life)

Part Number Build-Up Example: Series 9-112131412**51**
LED's are available on a T-1¾ flange base – consult factory.



Group 6—Switches

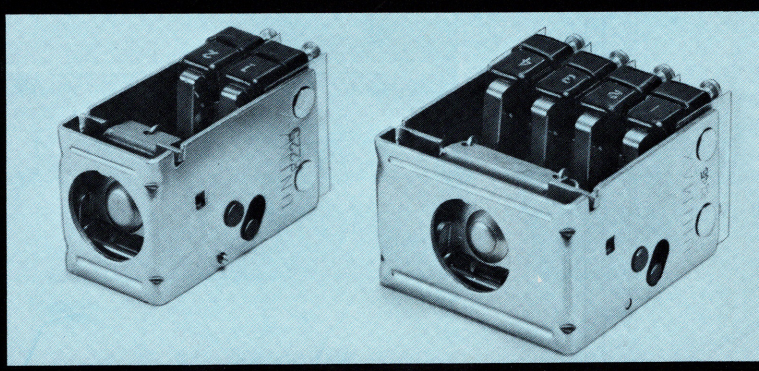
(1 Each Required)

Standard switches are furnished with silver contacts. Please note: when ordering a completed indicator unit, (9-16), use code number 60.

Switches are furnished with silver contacts

Code No.	Description
60	Units furnished less switch module
61	2SPDT Momentary Action
62	3SPDT Momentary Action
63	4SPDT Momentary Action
64	2SPDT Alternate Action
65	3SPDT Alternate Action
66	4SPDT Alternate Action

Part Number Build-Up Example: Series 9-1121314125**61**



Group 7—Front Lens

(1 Each Required)

Code No.	Description
70	Unit Furnished less front lens
71	Standard front lens

Part Number Build-Up Example: Series 9-112131412516**71**

Note: If unit is desired less engraving, end part number here! If engraving is desired as part of the completed assembly, continue P/N per instructions under "ENGRAVING".
(See page 11)

Group 8—Engraving

Consult the Legend Arrangements for the appropriate lineage and horizontal/vertical set-up, and add the code number to your order code.

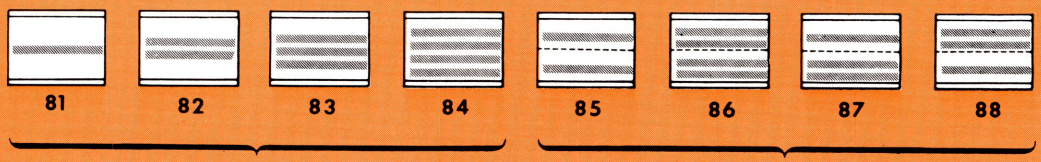
Follow the code with the words to be engraved. Insert commas to denote a new line of engraving and a slash (/), to denote a new lens division. As with the procedure for colored filters, start with the upper left lens division and work clockwise.

Legends are engraved and filled on the reverse side of the front lens (P/N 9-71). Standard engraving is 1/8" high with a .020 stroke.

Part Number Build-Up Example: Series 9-1121314125161718 1 Power

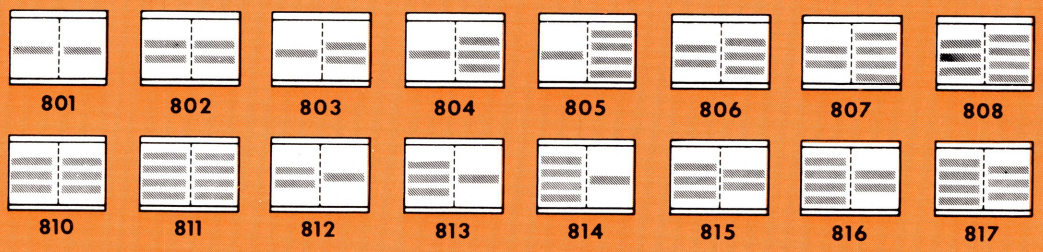
LEGEND ARRANGEMENTS

12 LETTERS OR SPACES PER ROW

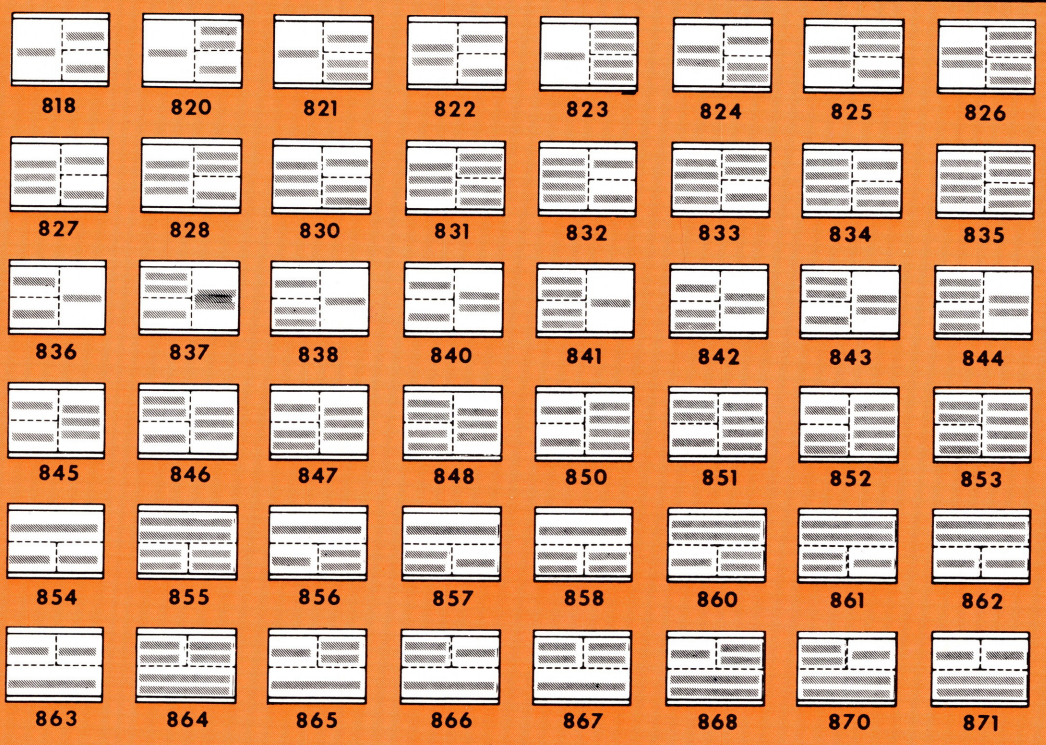


FULL DISPLAY | **HORIZONTALLY DIVIDED**

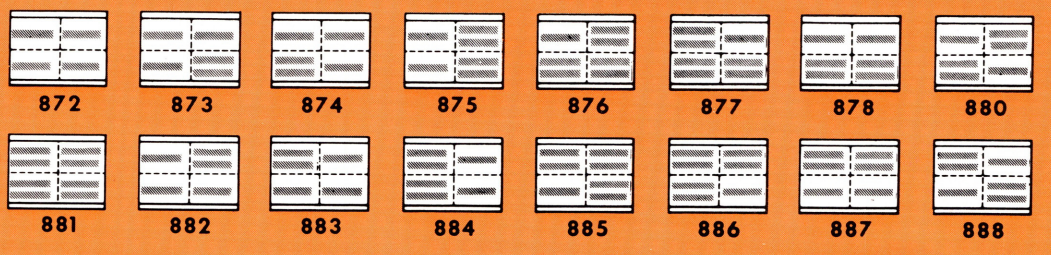
VERTICALLY DIVIDED 5 LETTERS OR SPACES PER ROW



3 - WAY DIVIDED 5 AND 12 LETTERS OR SPACES PER ROW

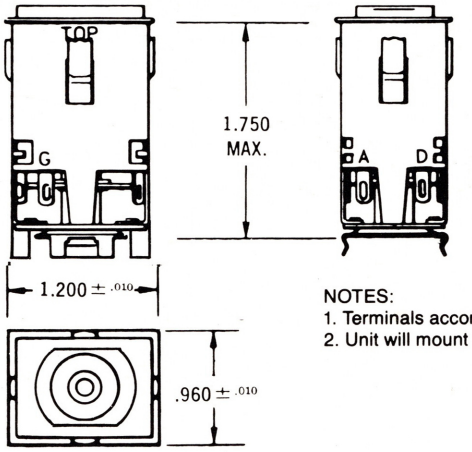


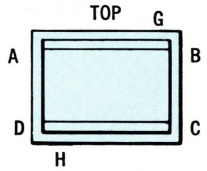
4 - WAY DIVIDED 5 LETTERS OR SPACES PER ROW



BASIC DIMENSIONS

INDICATOR AND ACTUATOR UNIT

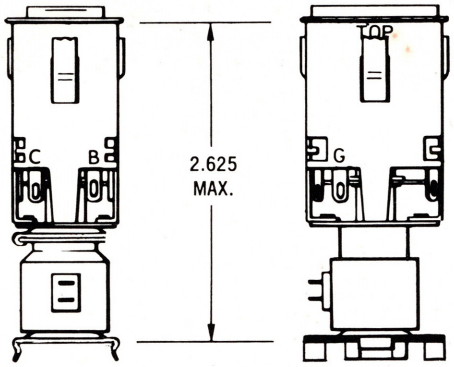




TERMINAL DESIGNATIONS
FRONT VIEW

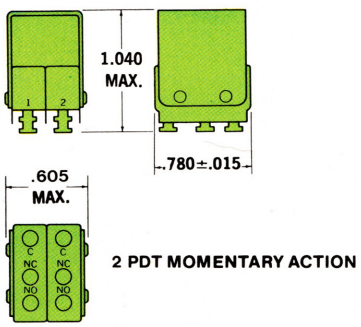
NOTES:
1. Terminals accommodate two #20 (AWG) wire leads.
2. Unit will mount in panel of .040" to .250" thickness.

WITH HOLDING COIL UNIT

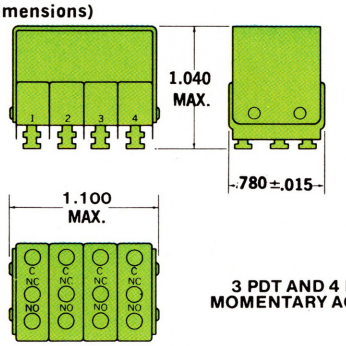


SWITCH DIMENSIONS

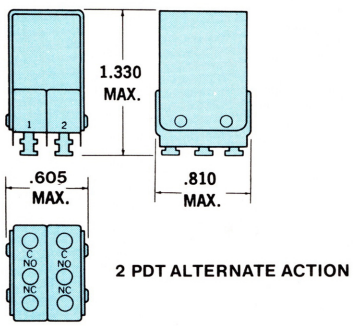
(See page 7 for terminal dimensions)



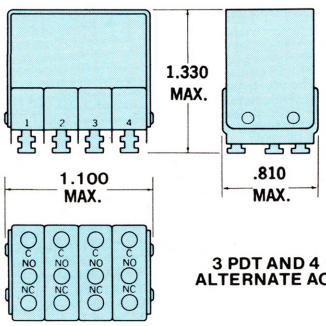
2 PDT MOMENTARY ACTION



3 PDT AND 4 PDT
MOMENTARY ACTION

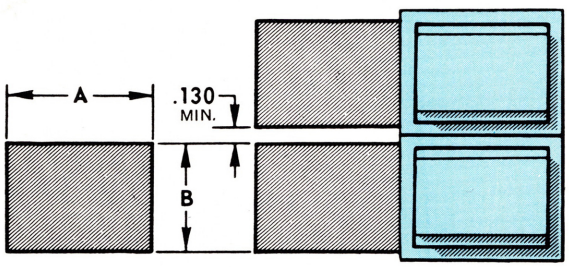


2 PDT ALTERNATE ACTION



3 PDT AND 4 PDT
ALTERNATE ACTION

PANEL CUTOUT DIMENSIONS



NO. OF UNITS	A	B	NO. OF UNITS	A	B
1	1.110	.870	6	7.160	5.720
2	2.320	1.840	7	8.370	6.690
3	3.530	2.810	8	9.580	7.660
4	4.740	3.780	9	10.790	8.630
5	5.950	4.750	10	12.000	9.600

Panel cutout tolerances ± .010

Unimax Switch®

UNIMAX SWITCH CORPORATION
A Subsidiary of The Unimax Corporation
P.O. Box 152, Ives Road, Wallingford, Conn. 06492
Tel. (203) 269-8701 TWX: 710-476-1397

20 AUG 84 21 12

19M2-25/10M
Printed in U.S.A.

(SUPPLEMENT TO CATALOG 50)
AUGUST 1979

LPB® Unimax Series 9M

LIGHTED PUSHBUTTON SWITCH

UNIMAX SERIES 9M LIGHTED PUSHBUTTON SWITCHES MEET THE REQUIREMENTS OF MIL-S-22885. A COMPLETE UNIT CROSS REFERENCE BETWEEN MIL PART NUMBERS AND UNIMAX PART NUMBERS IS SHOWN ON THE REVERSE SIDE OF THIS BULLETIN.

140

ORDERING INFORMATION FOR UNIMAX SERIES 9M

(REFERENCE CATALOG 50)

For Complete Assemblies

Code numbers are assigned to each individual variation within a sub-assembly or component group. The final ordering code for a completely assembled unit consists of a composite of the code numbers for each of the sub-assemblies or features you have selected. The final code number must be grouped so the first numbers of all code numbers are in numerical sequence. Always identify the assembly by preceding it with the prefix "9M_"

Note: When a sub-assembly or feature is to be omitted, there is a code number assigned to the ommission as well. These code numbers MUST be used when an omission is desired.

For Separate Sub-Assemblies or Components

Individual sub-assemblies or components may be ordered by using the prefix "9M_" and selecting the code number appropriate to the sub-assembly selected.

SERIES 9M– 1_1 2_1 3_1 4_{12} 5_1 6_1 7_1 8_1

- Basic Unit–Group 1 (See page 9*)
- Lamp Circuit–Group 2 (See page 9*)
- Diffuser Style–Group 3 (See page 9*)
- Colored Lamp Filters–Group 4 (See page 10*)
- Lamps–Group 5 (See page 10*)
- Switches–Group 6 (See Below)
- Front Lens–Group 7 (See page 10*)
- Legend Arrangement–Group 8 (See page 11*)

*Refer to Catalog 50

GROUP 6 – SWITCHES

Code No.	Description
60	Units Furnished Less Switch Module
684	2PDT Momentary Action
686	4PDT Momentary Action
688	2PDT Alternate Action
690	4PDT Alternate Action

The following is a cross reference of the MIL-S-22885 part numbers to the Unimax Switch Series 9M part numbers. Part numbers shown are for units without lamps or color filters. When color filters or lamps are required add code number within ( ) per Unimax Catalog 50.

Military Part Number	Unimax Part Number
Switch Type	
M22885/9-01(XXXX)	9M-1121314(XXXX)5(X)68471
M22885/9-02(XXXX)	9M-1121314(XXXX)5(X)68671
M22885/9-03(XXXX)	9M-1121314(XXXX)5(X)68871
M22885/9-04(XXXX)	9M-1121314(XXXX)5(X)69071
M22885/9-09(XXXX)	9M-1121334(XXXX)5(X)68471
M22885/9-10(XXXX)	9M-1121334(XXXX)5(X)68671
M22885/9-11(XXXX)	9M-1121334(XXXX)5(X)68871
M22885/9-12(XXXX)	9M-1121334(XXXX)5(X)69071
M22885/9-13(XXXX)	9M-1124334(XXXX)5(X)68471
M22885/9-14(XXXX)	9M-1124334(XXXX)5(X)68671
M22885/9-15(XXXX)	9M-1124334(XXXX)5(X)68871
M22885/9-16(XXXX)	9M-1124334(XXXX)5(X)69071
M22885/9-17(XXXX)	9M-1121324(XXXX)5(X)68471
M22885/9-18(XXXX)	9M-1121324(XXXX)5(X)68671
M22885/9-19(XXXX)	9M-1121324(XXXX)5(X)68871
M22885/9-20(XXXX)	9M-1121324(XXXX)5(X)69071
M22885/9-21(XXXX)	9M-1122324(XXXX)5(X)68471
M22885/9-22(XXXX)	9M-1122324(XXXX)5(X)68671
M22885/9-23(XXXX)	9M-1122324(XXXX)5(X)68871
M22885/9-24(XXXX)	9M-1122324(XXXX)5(X)69071
M22885/9-25(XXXX)	9M-1122314(XXXX)5(X)68471
M22885/9-26(XXXX)	9M-1122314(XXXX)5(X)68671
M22885/9-27(XXXX)	9M-1122314(XXXX)5(X)68871
M22885/9-28(XXXX)	9M-1122314(XXXX)5(X)69071
Indicator Type	
M22885/10-01(XXXX)	9M-1621314(XXXX)5(X)6071
M22885/10-03(XXXX)	9M-1621334(XXXX)5(X)6071
M22885/10-04(XXXX)	9M-1624334(XXXX)5(X)6071
M22885/10-05(XXXX)	9M-1621324(XXXX)5(X)6071
M22885/10-06(XXXX)	9M-1622324(XXXX)5(X)6071
M22885/10-07(XXXX)	9M-1622314(XXXX)5(X)6071
M22885/10-08(XXXX)	9M-1624314(XXXX)5(X)6071
Switch Module	
M22885/11-01	2PDT Momentary Action 9M-684
M22885/11-02	4PDT Momentary Action 9M-686
M22885/11-03	2PDT Alternate Action 9M-688
M22885/11-04	4PDT Alternate Action 9M-690
Colored Lamp Filter	
M22885/12-01	B-Blue 9M-47
M22885/12-02	G-Green 9M-42
M22885/12-03	R-Red 9M-41
M22885/12-04	W-White 9M-46
M22885/12-05	Y-Yellow 9M-44
M22885/12-06	A-Amber 9M-43

8-79

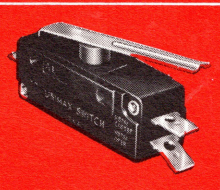
Unimax Switch®

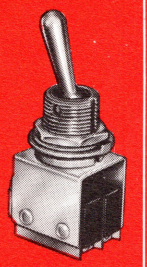
PRINTED IN U.S.A.

UNIMAX SWITCH CORPORATION
A Subsidiary of The Unimax Group Inc., Wallingford, Conn. 06492
(203) 269-8701

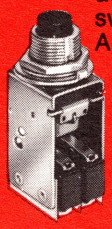
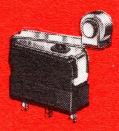
FOR MORE DETAILED INFORMATION, ASK FOR THE APPROPRIATE COMPLETE CATALOG SHOWN BELOW.

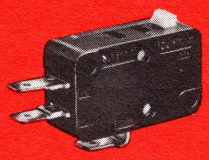
UNIMAX
Snap-acting Switches





The industry's widest selection of precision, general purpose, miniature and sub-miniature snap-action switches, as well as toggle and push-button switch assemblies. Ratings from low-level to 25A. All actuator styles available. Ask for catalog 60.

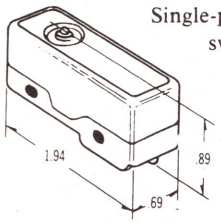





BASIC PRECISION

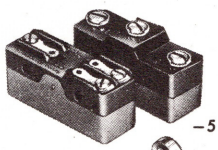
SERIES **2HB**

20 amperes 125, 250, 480 volts a-c
½ ampere 125 volts d-c
¼ ampere 250 volts d-c
UL and CSA listing.



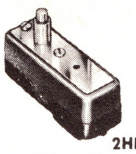
Single-pole double-throw basic precision snap-acting switches; available with —1 or —5 bases.

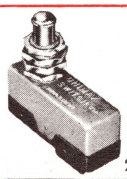
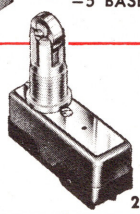
—1 BASE



—5 BASE

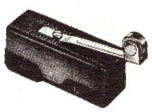
PLUNGER TYPES

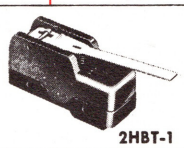


FORCE and MOVEMENT SPECIFICATIONS	2HB-1	2HBQ-1	2HBD-1	2HBJ-1	2HBR-1
Operate force range — ounces	9 to 13	9 to 13	9 to 13	9 to 13	9 to 13
Release force — ounces	4 min.	4 min.	4 min.	4 min.	4 min.
Movement differential — inches	.0004 to .002	.0004 to .002	.0004 to .002	.0004 to .002	.0004 to .002
Pretravel — inches	.020 max.	.020 max.	.020 max.	.020 max.	.020 max.
Overtravel — inches	.005 min.	.062 min.	.055 min.	.219 min.	.141 min.
Contact separation — inches	.020	.020	.020	.020	.020

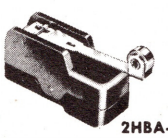
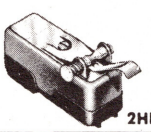
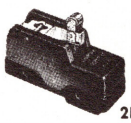
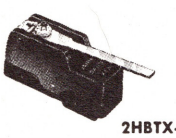
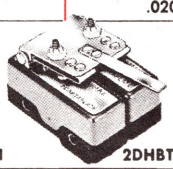
LEAF and LEVER TYPES





FORCE and MOVEMENT SPECIFICATIONS	2HBL-1	2HBW-1	2HBY-1	2HBF-1	2HBT-1
Operate force range — ounces	5 max.	5 max.	10 max.	10 max.	1 to 2.5
Release force — ounces	0.5 min.	0.5 min.	3 min.	3 min.	0.5 min.
Movement differential — inches	.050 max.	.050 max.	.009 max.	.008 max.	.078 max.
Pretravel — inches	.156 max.	.156 max.	.094 max.	.078 max.	.125 to .375
Overtravel — inches	.062 min.	.062 min.	.094 min.	.094 min.	.188 min.
Contact separation — inches	.020	.020	.020	.020	.020

LEAF and LEVER TYPES

FORCE and MOVEMENT SPECIFICATIONS	2HBA-1	2HBM-1	2HBN-1	2HBTX-1	2DHBTX-1
Operate force range — ounces	1 to 3.5	10 max.	8 max.	2 max.	3.5 max.
Release force — ounces	0.75 min.	3 min.	1.5 min.	0.25 min.	0.5 min.
Movement differential — inches	.062 max.	.047 max.	.015 max.	.031 max.	.094 max.
Pretravel — inches	.094 to .313	.030 to .109	—	.050 to .187	depends on adjustments
Overtravel — inches	.156 min.	.094†	.062 min.	.093 min.	
Contact separation — inches	.020	.020	.020	.020	.020

† Applied overtravel should not exceed .094

Unimax Switch

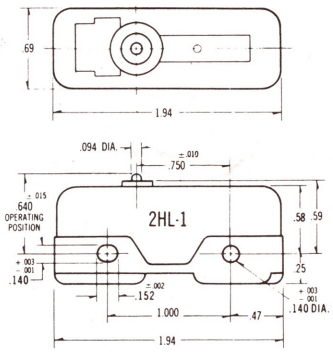
140

HEAVY-DUTY

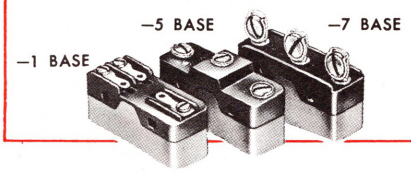
SERIES 2HL

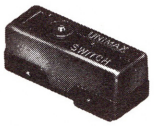
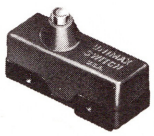
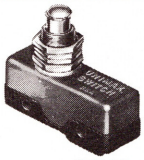
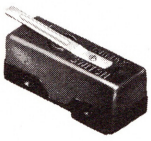
1 hp 125 v. a-c. 2 hp 250 v. a-c.
20 amp. 125, 250, 480 v. a-c.
10 amp. 125 v. a-c, lamp load.
In-rush current 75 a, 480 v. a-c.

Single-pole, double-throw precision, snap-acting switches for control of heavy-duty electric circuits, including motor loads. UL listed.

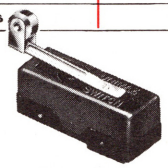
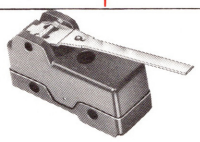
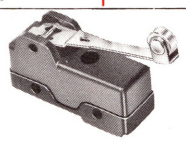


THREE STYLES OF BASES, shown below, are available for all heavy-duty (Series HL) and high-current (Series HG) switches.



FORCE and MOVEMENT SPECIFICATIONS	2HL-1	2HLD-1	2HLJ-1	2HLL-1
Operate force range — ounces	14 to 22	14 to 22	14 to 22	9 max.
Release force — ounces	10 min.	10 min.	10 min.	1 min.
Movement differential — inches	.0075 max.	.0075 max.	.0075 max.	.065 max.
Pretravel — inches	.050 max.	.050 max.	.050 max.	.344 max.
Overtravel — inches	.010 min.	.093 min.	.219 min.	.062 min.
Contact separation — inches	.025	.025	.025	.025

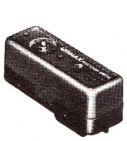
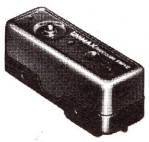
FORCE and MOVEMENT SPECIFICATIONS	2HLW-1	2HLT-1	2HLA-1
Operate force — ounces	9 max.	2.5 max.	2.5 max.
Release force — ounces	1 min.	0.5 min.	0.5 min.
Movement differential — inches	.065 max.	.109 max.	.085 max.
Pretravel — inches	.281 max.	.594 max.	.468 max.
Overtravel — inches	.062 min.	.078 min.	.062 min.
Contact separation — inches	.025	.025	.025

HIGH-CURRENT Series 2HG

25 amp. 125, 250 volts a-c.
1 horsepower 125 volts a-c.
2 horsepower 250 volts a-c.
UL and CSA listing.

Same dimensions and in same actuator-styles as Series 2HL.

HIGH-SENSITIVITY

WHB

15 amp. 125, 250, volts a-c.
UL and CSA listing.

Small movement differential, low operate force, and high repeat accuracy. Case size: same as Series 2HB.

FORCE and MOVEMENT SPECIFICATIONS	WHB-1	WHR-1
Operate force range — ounces	7 to 9	11 to 18
Release force — ounces	4 min.	9 min.
Movement differential — inches	.0005 max.	.0008 max.
Pretravel — inches	.015 max.	.030 max.
Overtravel — inches	.005 min.	.012 min.
Contact separation — inches	.010	.010

SPECIAL PURPOSE

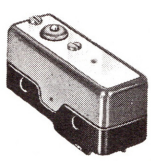
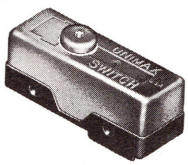
HIGH CURRENT-CLOSE MOTION WHR

For direct control of electric heater loads. Same size as Series 2HB.

22 amperes, 125/277 v.a-c
¼ horsepower, 125 v .a-c
½ horsepower, 250 v .a-c
UL and CSA listing.

SEALED

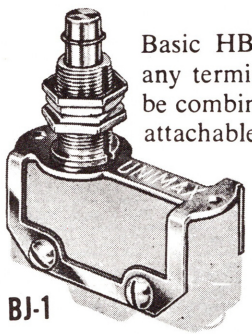
Splashproof version of basic precision and heavy duty series. Actuator styles available.

FORCE and MOVEMENT	2HB260-1	2HL260-1
Operate force range-oz.	8 to 14	13 to 23
Release force — oz.	3 min.	9 min.
Movement diff.— inches	.0004 to .002	.0075 max.
Pretravel —inches	.040 max.	.050 max.
Overtravel — inches	.005 min.	.010 min.
Contact separation — inches	.020	.025

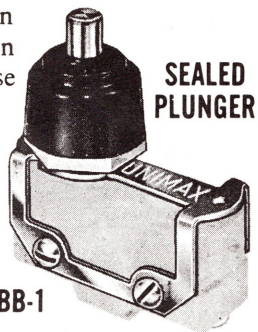
AUXILIARY ACTUATORS

Basic HB switches, in any terminal-style, can be combined with these attachable actuators.



BJ-1
OVERTRAVEL PLUNGER

SEALED PLUNGER



BB-1

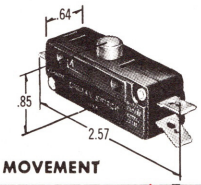
GENERAL PURPOSE

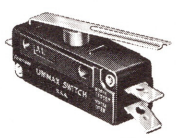
SERIES A

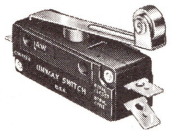
SINGLE-POLE DOUBLE-THROW

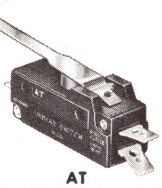
High-performance, low-cost, snap-acting switch with quick-connect terminals.

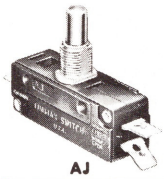
15 amperes 125, 250 volts a-c.
¾ horsepower 125 volts a-c.
1½ horsepower 250 volts a-c.
Und.Lab.,Inc. and CSA listing.

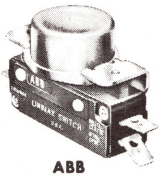










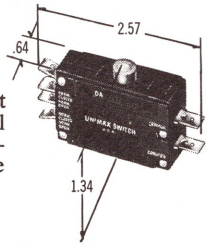


FORCE and MOVEMENT	A	AL	AW	AT	AJ	ABB
Operate force — ounces	20 max.	12 max.	12 max.	4 max.	20 max.	20 max.
Release force — ounces	3 min.	1 min.	1 min.	½ min.	3 min.	3 min.
Movement differential — inches	.010 max.	.093 max.	.093 max.	.062 max.	.010 max.	.010 max.
Pretravel — inches	.050 max.	.281 max.	.250 max.	.250 max.	.050 max.	.050 max.
Overtravel — inches	.050 min.	.062 min.	.062 min.	.187 min.	.187 min.	.050 min.
Contact separation —inches	.020	.020	.020	.020	.020	.020

DOUBLE-POLE DOUBLE-THROW

SERIES DA

Same electrical rating as Series A but double-pole, double-throw; or can control two separate single-pole, double-throw circuits with the same actuating button; same actuators as Series A.



FORCE and MOVEMENT SPECIFICATIONS	DA
Operate force — ounces	30 max.
Release force — ounces	6 min.
Movement differential — inches, per pole	.010 max.
Pretravel — inches, first pole	.050 max.
Overtravel — inches, second pole	.050 min.
Contact separation — inches	.020

HIGH-CURRENT GENERAL-PURPOSE

25 amperes 125, 250 volts a-c.
1 horsepower 125 volts a-c.
2 horsepower 250 volts a-c.
Und. Lab. Inc. and CSA listing.

Single-pole double-throw Series A800 and double-pole double-throw Series DA800; same dimensions and actuators as Series A and DA.

SEALED GENERAL-PURPOSE

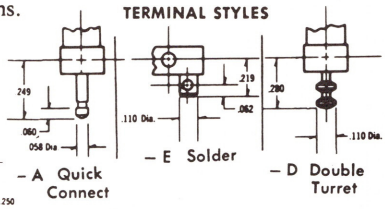
The 15-ampere and 25-ampere styles of general-purpose switches can be furnished with cases sealed against moisture; contact factory for details.

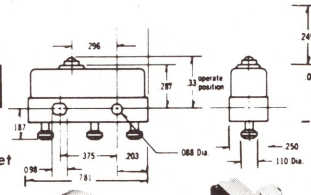
SUBMINIATURE

These switches are suitable for use in most applications. Can be used at temperatures up to 275° F. Available with four terminal styles.

GENERAL PURPOSE TYPE

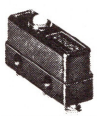
2LM•3LM•24LM

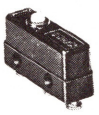


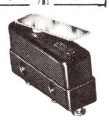


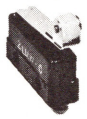
RATINGS AMPERES	125VAC	250VAC	30 VOLTS D.C. Sea Level Res.	Sea Level Ind.	50,000 Ft. Res.	50,000 Ft. Ind.
2LM	5*	5*	5	3	4	2.5
3LM	10*	10*	5	3	4	2.5
24LM	1*		1*	.5	1	.5

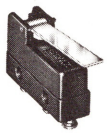
*UL and CSA listings



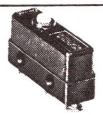








FORCE and MOVEMENT SPECIFICATIONS	24LM-C 2LM-C	3LM-C	2LML-C	2LMW-C	2LMT-C	2LMA-C
Operate force — max.	5 oz.	6 oz.	6 oz.	6 oz.	40 grams	40 grams
Release force — min.	1 oz.	2 oz.	0.5 oz.	0.5 oz.	7 grams	7 grams
Movement differential — inches	.004 Max.	.004 Max.	.031 Max.	.031 Max.	.019 Max.	.019 Max.
Pretravel — inches	.030 Max.	.030 Max.	.094 Max.	.094 Max.	.085 Max.	.085 Max.
Overtravel — inches	.005 min.	.005 min.	.047 min.	.047 min.	.011 min.	.011 min.

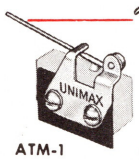


MILITARY TYPE 5LM

5LMI-E conforms to the requirements of MIL-S-8805 and military drawing MS25085-1; 5LMI-D conforms to the requirements of MS25085-2.

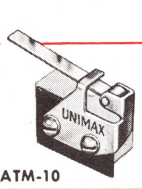
FORCE and MOVEMENT	5LM
Operate force — oz. max.	5
Release force—oz. min.	2
Movement diff. in. max.	.004
Pretravel — in. max.	.030
Overtravel — in. min.	.005

LOW-FORCE AUXILIARY ACTUATORS

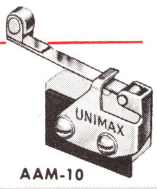


ATM-1 ATM-5

When secured to basic 2LM, 3LM, or 5LM switches by the mounting screws, these rigid-lever actuators provide extremely low operate force and high repeatability. Length and shape of lever-arm can be furnished to suit specific applications.



ATM-10



AAM-10

MANUALLY OPERATED ASSEMBLIES

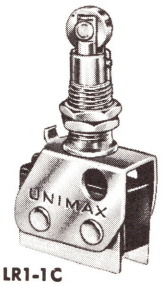
These assemblies utilize 3LM-Type subminiature basic switches.

RATINGS AMPERES				
250VAC	30 VOLTS D.C.			
	Sea Level Res.	Sea Level Ind.	50,000 Ft. Res.	50,000 Ft. Ind.
10*	5	3	4	2.5

*UL and CSA listings

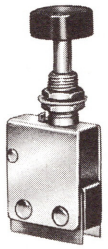
PLUNGER and PUSHBUTTON SWITCHES

1LJ1-1C

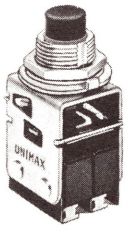


1LR1-1C

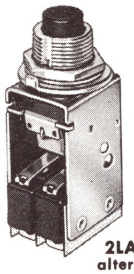
Bushing with 1/4-40 thread permits mounting in panels up to 5/16" thick. Roller of Type 1SR-1 is stainless steel, 250" diameter.



1LJ5-1C
"Feather-touch" push-button actuator for rapid-repeat operation.



2LJ6-1C
momentary-contact

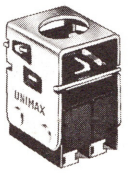


2LA6-1C
alternate action

Snap-drive actuator gives positive non-tease double-pole double-throw operation; also available in 3PDT and 4PDT.

FORCE and MOVEMENT	1LJ1	1LR1	1LJ5	2LJ6	2LA6
Operate force	12 oz. max.	12 oz. max.	3 oz. max.	30 oz. approx.	3 lb. approx.
Total travel — inches	.031 approx.	.031 approx.	.250 approx.	.10 approx.	.10 approx.

SWITCH MODULES

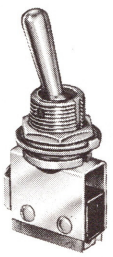


For lighted push-button actuators. Snap drive in DPDT momentary-contact (9-61) or push-on push-off (9-64) action. Also available in 3PDT and 4PDT.

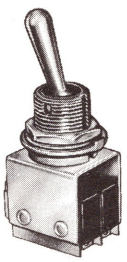
TOGGLE SWITCHES

1LB1-1C
2-position SPDT switch; maintained in both positions; miniature bat-handle actuator in threaded barrel.

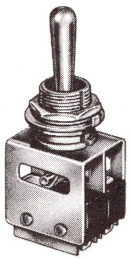
2LB1-1C
2-position DPDT switch; maintained in both positions; miniature bat-handle actuator in threaded barrel.



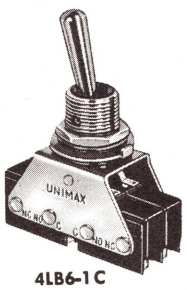
1LB5-1C
2-position SPDT switch; maintained in both positions; bat-handle actuator in threaded barrel.



2LB5-1C
2-position DPDT switch; maintained in both positions; bat-handle actuator in threaded barrel.



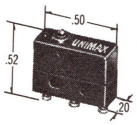
2LB4-1 C
3-position DPDT switch available in choice of maintained and momentary actions; bat-handle in threaded barrel.



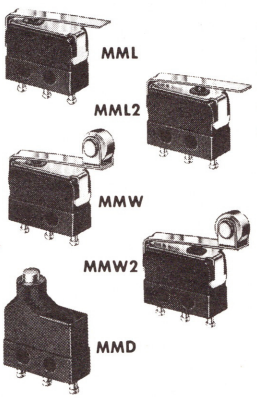
4LB6-1 C
2-position 4PDT switch; maintained in both positions; large bat-handle in panel-mount barrel.

MINIATURE-SUBMINIATURE

SERIES
MM



7 amperes 28 v. d-c, resistive
4 amperes 28 v. d-c, inductive } *at sea level*
4 amp. 28 v. d-c, motor load } *at sea level*
2.5 amp. 28 v. d-c, lamp load } *at sea level*
2.5 amp. 28 v. d-c, ind., at 50,000 ft.
Inrush current—24 amperes
7 a. 125/250 v. 60 cycles, res. & ind.
Inrush current—15 amperes
MM5 meets MS 24547-1 per MIL-S-8805
MM6 meets MS 24547-2 per MIL-S-8805



These exceptionally compact SPDT switches are furnished with turret terminals molded into housing of high-strength phenolic. Integral actuators permit wide choice of operating means and simplify installation. Can be stacked five to the inch. For "dry" circuits, or where contaminants may be present, specify Type MM10; this unit has gold contacts.

FORCE and MOVEMENT SPECIFICATIONS	MM MM10	MML MMW	MML2 MMW2	MMD
Operate force — ounces, max.	5	4	6	5
Release force — ounces, min.	1	1	1	1
Movement differential — in., max.	0.002	.025	.012	.004
Pretravel — inches, max.	0.020	.090	.075	.030
Total overtravel — inches, min.	0.004	.045	.015	.040

MINIATURE

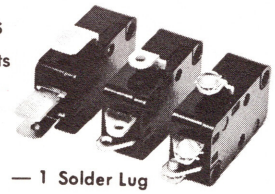
Low force, single pole double-throw snap acting switches with long life and high reliability. Available with 3/16" and ¼" wide quick connect terminals and soldering and screw terminals. Tables give standard specifications. Two lever pivot locations make wide range of characteristics available.

STANDARD SERIES 2TM

The 2TM series provides a complete line of low force, high reliability miniature switches—they are available with the terminal styles shown.

10 amperes, 250 Volts A-C
⅓ Horsepower, 125/250 Volts A-C
¼ A. 250 V., D-C; ½ A. 125
UL and CSA listing.

TERMINALS
Quick Connects
—4 3/16"
—4A ¼"

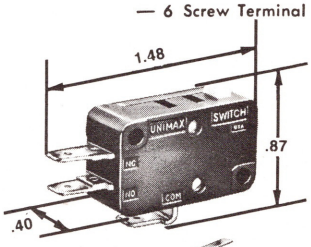


— 1 Solder Lug
— 6 Screw Terminal

LOW LEVEL SERIES 24TM

The 24TM series miniature switches are constructed with gold alloy cross bar contacts for switching low energy circuits and up to 1A, 125 VAC, 30 VDC. They are available with —1 and —4 terminal styles.

1 ampere, 125 volts a-c.
1 ampere, 30 volts d-c.
UL and CSA listing.

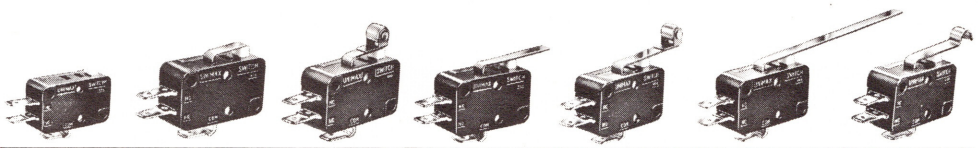


FORCE and MOVEMENT SPECIFICATIONS	2TM-4 24TM-4	2TMT-4 24TMT-4	2TMA-4 24TMA-4	2TMT15-4 24TMT15-4	2TMA15-4 24TMA15-4	2TMT18-4 24TMT18-4	2TMT14-4 24TMT14-4
Operate force — grams max.	75	90	90	45	45	15	50
Movement Differential — in. max.	.013	.013	.013	.032	.030	.078	.050
Pretravel — in. max.	.056	.080	.070	.16	.16	.375	.140
Overtravel — in. min.	.040	.040	.040	.075	.065	.160	.062

HEAVY DUTY SERIES 3TM

15 amp ½ hp 125/250 volts a-c

The 3TM series miniature switches are for control of heavy duty electrical circuits, up to 15A 250VAC. They are available with terminal styles shown above.

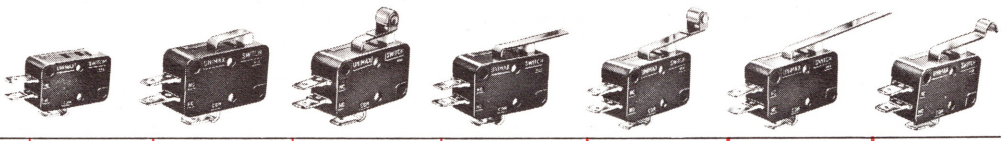


FORCE and MOVEMENT SPECIFICATIONS	3TM-4	3TMT-4	3TMA-4	3TMT15-4	3TMA15-4	3TMT18-4	3TMT14-4
Operate force — grams max.	150	180	180	80	80	35	90
Movement Differential — in. max.	.013	.013	.013	.040	.030	.078	.050
Pretravel — in. max.	.056	.080	.070	.160	.160	.375	.140
Overtravel — in. min.	.040	.040	.040	.075	.065	.160	.062

EXTRA LOW FORCE SERIES 6TM

10 amp ⅓ hp 125/250 volts a-c

The 6TM series miniature switches are designed for extremely low force applications, requiring high electrical capacity, up to 10A, 250VAC. They are available with terminal styles shown above.

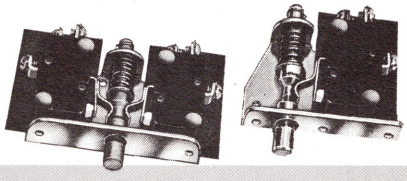


FORCE and MOVEMENT SPECIFICATIONS	6TM-4	6TMT-4	6TMA-4	6TMT15-4	6TMA15-4	6TMT25-4	6TMT14-4
Operate force — grams max.	50	60	60	25	25	15	30
Movement Differential — in. max.	.013	.013	.013	.040	.047	.090	.050
Pretravel — in. max.	.056	.080	.070	.160	.160	.330	.140
Overtravel — in. min.	.040	.040	.040	.075	.065	.140	.062

SERIES TL

SAFETY INTERLOCK MINIATURE SWITCHES

Cut off power when enclosure door is opened; permit manual re-closing for live-circuit testing; automatically restore safety interlock when door is reclosed. SPDT and DPDT switching; side or end mounting; stainless steel or plastic operating plunger.

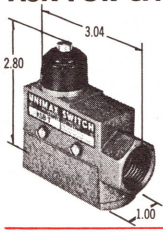


METAL-CASED

ASK FOR CATALOG 30

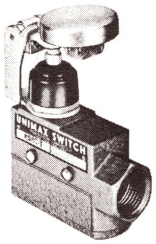
KS SERIES | COMPACT

Same electrical ratings as Series 2HB (page 1).

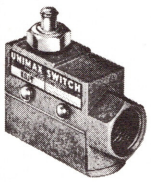


KSB-T
Sealed plunger for long-overtravel applications; switch is protected against dirt and splashable liquids.

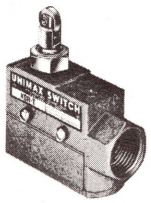
KSB15-T
Switch operates under vertical or lateral (15° movement) force on flexible-rod actuator.



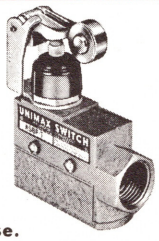
KSBC-T
Large, smooth knob for hand or knee operation; lever is adjustable vertically and can be rotated horizontally; sealed plunger and sturdy die-cast actuator parts for severe service conditions.



KSJ-T
Plain plunger for long - overtravel where operating force is applied in line with plunger.



KSR-T
Roller plunger for use with cams or slides that move in same plane as length of switch.

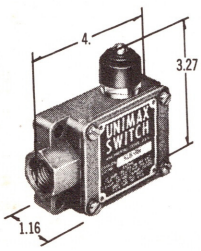


KSBP-T
Roller-lever actuator with sealed plunger for slide or cam operation; adjustable vertically and can be rotated horizontally. Sturdy, die-cast actuator parts for reliability under severe service.

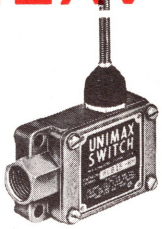
KS series is also available with flanged mounting base.

KL SERIES HEAVY-DUTY

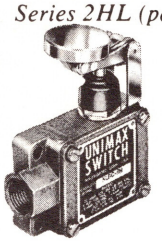
Same electrical ratings as Series 2HL (page 2).



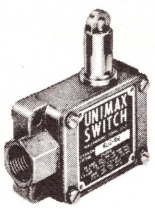
KLB-RH
Sealed plunger for long overtravel applications; switch is protected against dirt and splashable liquids.



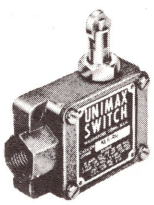
KLB15-RH
Switch operates under vertical or lateral (15° movement) force on flexible-rod actuator.



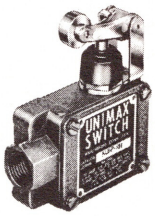
KLBC-RH
Large, smooth knob for hand or knee operation, lever is adjustable vertically and can be rotated horizontally, sealed plunger and sturdy die - cast actuator parts for severe service conditions.



KLG-RH
Sealed roller plunger for cam or slide actuation where moisture is present.



KLR-RH
Roller plunger for use with cams or slides that move in same plane as length of switch.



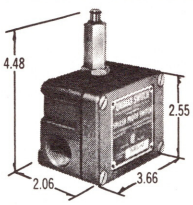
KLBP-RH
Roller - lever actuator with sealed plunger for slide or cam operation, adjustable vertically and can be rotated horizontally. Sturdy, die-cast actuator parts for reliability under severe service.

KSB-T	KSBC-T	KSBP-T	KSJ-T	KSR-T		KLB-RH	KLBC-RH	KLBP-RH	KLG-RH	KLR-RH
9 to 24	10 to 20	10 to 20	9 to 13	9 to 13	← oz. — Operate-force — lbs. →	2½ max.	2 max.	2 max.	8 max.	2½ max.
4 min.	6 min.	6 min.	4 min.	4 min.	← oz. — Release-force — lbs. →	½ min.	½ min.	½ min.	2 min.	¾ min.
.002 max.	.006 max.	.006 max.	.002 max.	.002 max.	Differential motion — inches	.010 max.	.020 max.	.020 max.	.0075 max.	.010 max.
.078 max.	.188 max.	.188 max.	.020 max	.020 max.	Pretravel — inches	.094 max.	.219 max	.219 max.	.125 max.	.094 max.
.219 min.	.219 min.	.219 min.	.219 min.	.140 min.	Overtravel — inches	.219 min.	.250 min.	.250 min.	.187 min.	.156 min.

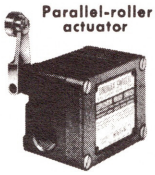
SPLASH-PROOF Series KWL and EXPLOSION-PROOF Series KXL

Same electrical ratings as Series 2HL (page 2).

KWL-J KXL-J
Hardened steel over travel plunger for in line application of operating force.



Parallel-roller actuator



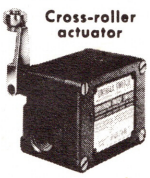
KWL-P, KWL-P2, KWL-P3
KXL-P, KXL-P2

KWL-P5, KWL-P6, KWL-P7
KXL-P5, KXL-P6

Continuously adjustable roller-lever actuators with roller parallel or perpendicular to actuating lever.

Clockwise operation — KWL-P, KXL-P, KWL-P5, KXL-P5
Counterclockwise — KWL-P2, KXL-P2, KWL-P6, KXL-P6
Bi-directional — KWL-P3 KWL-P7

Cross-roller actuator



Splash-proof series Explosion-proof series	KWL-J KXL-J	KWL-P KXL-P	KWL-P2 KXL-P2	KWL-P3	KWL-P5 KXL-P5	KWL-P6 KXL-P6	KWL-P7
Operate force	3 lb. max.	¾ to 2¼ lbs.		1¼ oz. max.	¾ to 2¼ lbs.		1¼ oz. max.
Release force	10 oz. min.	¼ lb. min.		½ oz. min.	¼ lb. min.		½ oz. min.
Differential motion — inches	.0075 max.	.020 max. (¾°)		.312 max. (12°)	.020 max. (¾°)		.312 max. (12°)
Pretravel — inches	.078 max.	.250 max. (9°)		.750 max. (30°)	.250 max. (9°)		.750 max. (30°)
Overtravel	.188 in. min.	60°		—	60°		—

All units furnished with attachable mounting-bracket.

Unimax Switch®

UNIMAX SWITCH CORPORATION
A Subsidiary of The Unimax Corporation
P.O. Box 152, Ives Road, Wallingford, Conn. 06492
Tel.(203) 269-8701 TWX: 710-476-1397

Printed in U.S.A.

19M2-22/20M